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THE DISTRIBUTION OF ROTIFERA ON MOUNT DESERT ISLAND. PART IV[1]

NEW NOTOMMATIDAE OF THE GENUS *CEPHALODELLA*

BY FRANK J. MYERS

Dixon-Nuttall and Freeman (1903), in their revision of the genus *Diaschiza* = *Cephalodella* Bory de St. Vincent, described fourteen species, one of which was new. Since then fifty-two additional species have been recorded and the end is not in sight. The genus is evidently destined to become a very large one, as it already contains more species than any other among the ploimate rotifers. This is partially accounted for by their small size as a group, and the fact that the majority are found in acid water, among submerged aquatic vegetation, especially *Sphagnum*, an association not very common in nature and one that has not been explored intensively, except by a few investigators who have concentrated on the group.

Although the genus now includes a great many species, they are readily distinguished by easily ascertained differences, the most important of which are as follows: the relative size of the animal, the position of the eyespot, or eyespots, if any, the relative length and shape of the toes; and the shape of the manubria, whether straight, recurved, decurved, clubbed or crutched at the tips.

As the internal anatomy of the various species is very constant, only the characters differing from the normal will be mentioned in order to avoid unnecessary repetition.

The species herein described were collected in acid water, marsh and littoral associations in various locations on the Island, during the springs and summers of 1921 to 1932 inclusive.

The fourteen new species described in this paper are as follows:

Cephalodella doryphora
Cephalodella tachyphora
Cephalodella mucosa
Cephalodella euknema
Cephalodella dorystoma
Cephalodella mira
Cephalodella eurynota
Cephalodella ablusa
Cephalodella astricta
Cephalodella lepida
Cephalodella poitera
Cephalodella akrobeles
Cephalodella praelonga
Cephalodella abstrusa

[1]The preceding parts of this article appeared in American Museum Novitates as follows: Part I (not numbered) in No. 494. Sept. 28, 1931; part II in No. 659, Sept. 15, 1933; part III in No. 660, Sept. 15, 1933.

Corrections and Omissions in Parts I to III of This Series of Articles

Part I, p. 6, and part III, pp. 1, 10, and 11: for *Eothina* read *Eothinia* in every case.

Parts II and III omitted to record that the following names of new species therein described had been previously published as *nomina nuda* in Remane, 1929–1933, Lief. 4 (1933), as follows:

Notommata endoxa	on page	551	
" *aethis*	"	"	"
" *avena*	"	"	"
" *apochaeta*	"	"	"
" *prodota*	"	"	"
" *fasciola*	"	"	"
Proales phaeopis (as *phacopis*)	"	"	542
" *adenodis*	"	"	"
" *ornata*	"	"	"
" *granulosa*	"	"	"
" *bemata*	"	"	"
" *gladia*	"	"	"
" *macrura*	"	"	"
Lindia caerulea	"	"	574
" *ecela*	"	"	"
Proalinopsis gracilis	"	"	544
" *phacus*	"	"	"
" *selene*	"	"	"

Order **Ploima**

Family **Notommatidae**

Cephalodella doryphora, new species

Figure 1

Cephalodella doryphora Remane, 1929–1933, p. 556 (*nomen nudum*).

The body is very short and stout. The head is large and obliquely truncate anteriorly. The neck is sharply marked off by a constriction. The abdomen is gibbous dorsally, deepest above the lumbar region, whence it falls away abruptly to the very short foot. The lorica is firm and the plates are very distinct. The toes are blade-shaped, acutely pointed and slightly decurved, diminishing gradually from the base to the tips.

The corona is oblique and strongly convex; the lips project in the form of a prominent cuticular beak.

The mastax is huge and of the specialized virgate type peculiar to the genus. The fulcrum is very long, stout and expanded posteriorly; the manubria are slender, recurved and semicircular, the slightly swollen tips being situated just under the eyespot. The epipharynx is long and acicular; it helps in perforating the integument of other rotifers on which this species feeds. However, it cannot be thrust out of the mouth opening, by a rocking of the mastax in a transverse plane, as in *Dorystoma caudata* (Bilfinger). The action of the mastax as a whole is quite normal.

The gastric glands and ovary are small.

The ganglion is long and carries a large eyespot, somewhat ventrally placed, at its posterior end.

Total length, 105μ; toes, 15μ.

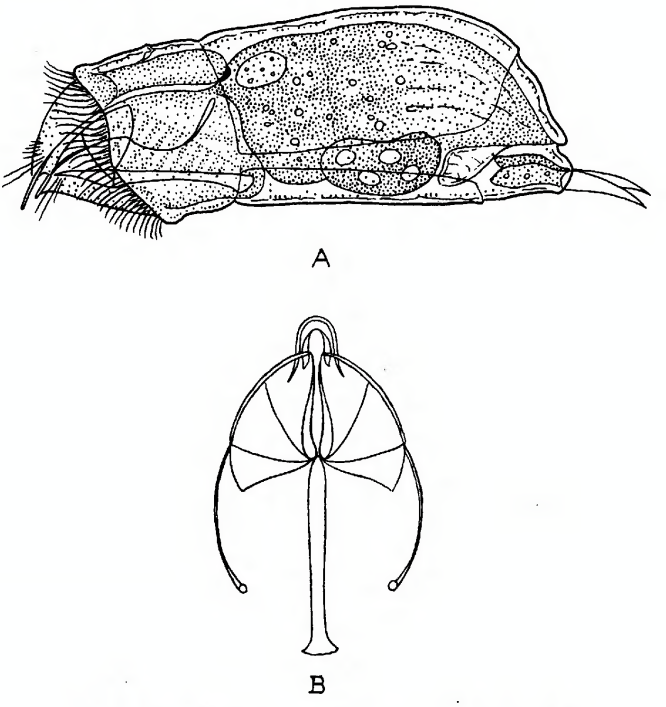

Fig. 1. *Cephalodella doryphora*, new species.
A, lateral view; B, trophi, ventral view.

Cephalodella doryphora was common during several summers in the Witch Hole and Aunt Bettie Pond, among submerged *Sphagnum*. It has also been collected sparingly in Atlantic County, New Jersey. The species bears a certain resemblance to *Cephalodella physalis* Myers, but is readily distinguished from it by the much smaller size, the very prominent beak, the trophi, and relatively shorter toes.

Cephalodella tachyphora, new species

Figure 2

Cephalodella tachyphora REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is short and stout, The head is large and slightly deflexed. The neck is sharply set off by a constriction. The abdomen is evenly arched dorsally; its greatest depth is near mid-length. The lorica is firm and the plates distinctly marked. The foot is short and overhung by a minute tail. The toes are very long, stout and

wide apart at the base, whence they taper gradually to very slender acute tips. The foot glands are stout and pyriform.

The corona is oblique and strongly convex; the lips protrude as two prominent cuticular processes.

The mastax is large. The fulcrum is very long, stout and abruptly expanded posteriorly. The manubria are reduced to very short slender rods, curving upward in the form of a semicircle. The epipharynx is slender and acicular; it helps in piercing the integument of other rotifers on which this species feeds.

The gastric glands are pyriform and the ovary is small.

The ganglion is long and carries an eyespot, somewhat dorsally placed, attached to its posterior end.

Total length, 130μ; toes, 45μ.

Cephalodella tachyphora was common among decaying *Utricularia* in the northeast arm of the Barcelona, during the summer of 1925. It

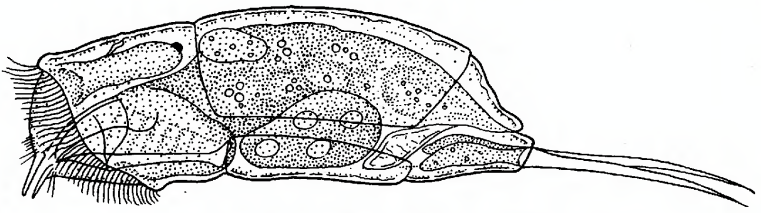

Fig. 2. *Cephalodella tachyphora*, new species.
Lateral view.

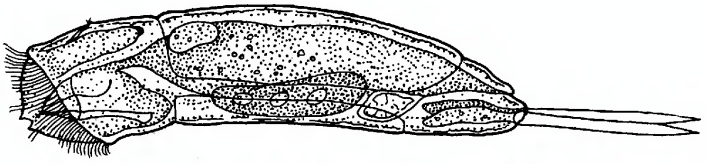

Fig. 3. *Cephalodella mucosa*, new species.
Lateral view.

has since been collected in abundance among marginal *Sphagnum* in Indian Cabin Creek, Atlantic County, New Jersey. Its movements are very fast and active. The shape of the body and the toes suggest *Cephalodella galbina* Myers. The position of the eyespot on the ganglion and the very prominent cuticular beak readily distinguish it from that species.

Cephalodella mucosa, new species

Figure 3

The body is prismatic and elongate. The head is somewhat deflexed and separated from the trunk by a well-marked neck constriction. The abdomen tapers gradually, being arched dorsally and somewhat concave ventrally. The lorica is firm and the plates are well defined. The foot is short and the tail is small. The toes are very long, blade-shaped and lanceolate. The foot glands are long and slender.

The corona is obliquely convex and has small projecting lips.

The mastax is normal in size. The fulcrum is long and somewhat expanded posteriorly; the manubria are very short, slender and abruptly recurved.

The ganglion is long, and carries a round eyespot attached to its posterior end.

Total length, 125μ; toes, 30μ.

Cephalodella mucosa is well distributed throughout the Island in the smaller bodies of water, such as pools in which there is an abundance of decaying *Sphagnum*. It is very rapid and active in its movements, and has no near relative in the genus.

Cephalodella euknema, new species

Figure 4

Cephalodella euknema REMANE, 1929–1933, p. 566 (*nomen nudum*).

The body is elongate, slender and cylindric. The head is moderately large and obliquely truncate anteriorly. The neck is well marked. The abdomen is nearly parallel-sided; it increases in depth but little toward the posterior portion. The lorica is quite flexible, but the plates are well defined. The foot is short and the tail is minute. The toes are very long and slender; they are slightly swollen near mid-length, whence they taper gradually to abrupt upturned, very slender tips.

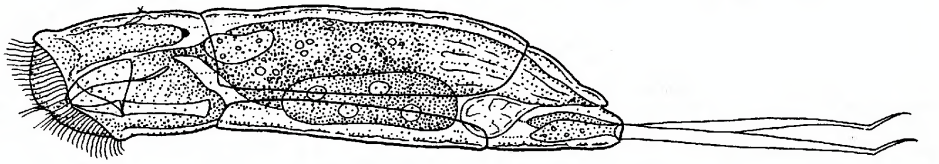

Fig. 4. *Cephalodella euknema,* new species.
Lateral view.

The corona is oblique and convex; the lips do not project.

The mastax is large. The fulcrum is very stout and expanded posteriorly; the manubria are very slender and recurved.

The ganglion is long and carries a small round eyespot attached to its posterior end.

Total length, 225μ; toes, 75μ.

Cephalodella euknema was collected near the outlet of Ripple Pond, among decaying meadow grass which had been washed into a small eddy. It bears a superficial resemblance to *Cephalodella tenuiseta* (Burn). The presence of a cervical eyespot, the much smaller size, and the shape of the toes readily distinguish it from that species.

Cephalodella dorystoma, new species

Figure 5

Cephalodella dorystoma REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is elongate and tapering. The head is relatively small and obliquely truncate anteriorly. The abdomen is cylindrical and evenly arched dorsally. The

lorica is quite firm and the plates are well defined. The toes are short, acute, and decurved. The foot glands are very large and pyriform.

The corona is oblique and strongly convex; the lips do not project.

The mastax is relatively small. The fulcrum is slightly expanded posteriorly; the manubria are straight, slender rods, somewhat expanded at the tips. The gastric glands are huge, being nearly equal to the mastax in size.

The ganglion is long and carries a small, clear, refringent vacuole near the posterior end.

Total length, 170μ; toes, 20μ.

Cephalodella dorystoma was collected during the summer of 1924 among vegetable detritus in Ripple Pond. There were no submerged aquatics, and collections were made in a quiet spot, not more than one square yard in area, where small pieces of detached and decaying meadow

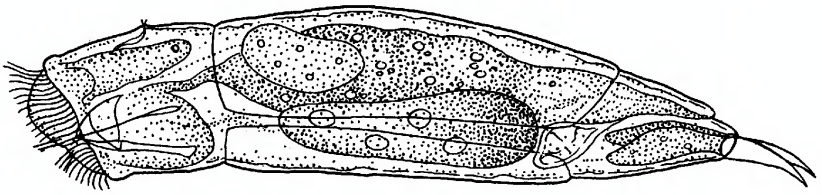

Fig. 5. *Cephalodella dorystoma*, new species.
Lateral view.

grass had accumulated. The rotifer has not been found again, although the location has been visited several times since.

The tendency among certain species of rotifers to disappear for longer or shorter intervals of time is well known. Up until 1929, *Cephalodella melia* Myers was one of the commonest species to be found in Atlantic County, New Jersey; it disappeared suddenly and has not been found since. *Tetrasiphon hydrochora* Ehrenberg was common in certain locations, among filamentous algae and desmids, in Atlantic County; it suddenly disappeared and none was found until three years had elapsed, when it reappeared in abundance.

Cephalodella dorystoma has no near relative. The clear eyespot, together with its position on the ganglion, the relatively very small mastax, the huge gastric glands, and the shape of the toes are enough to distinguish it readily from any other species of the genus.

Cephalodella mira, new species

Figure 6

Cephalodella mira REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is parallel-sided and nearly cylindrical throughout. The head is relatively small, and the neck is not well defined. The lorica is very thin and flexible, and

the plates are indistinct. The foot is robust and conical; the toes are short, blade-shaped, slightly recurved, ending in acute tips. The foot glands are large and pyriform.

The corona is convex and without projecting lips.

The mastax is large and somewhat aberrant. All the parts of the trophi are very slender. The fulcrum is long, slender and parallel-sided. The manubria are reduced to very thin rods that are slightly expanded at the tips. As the mastax functions

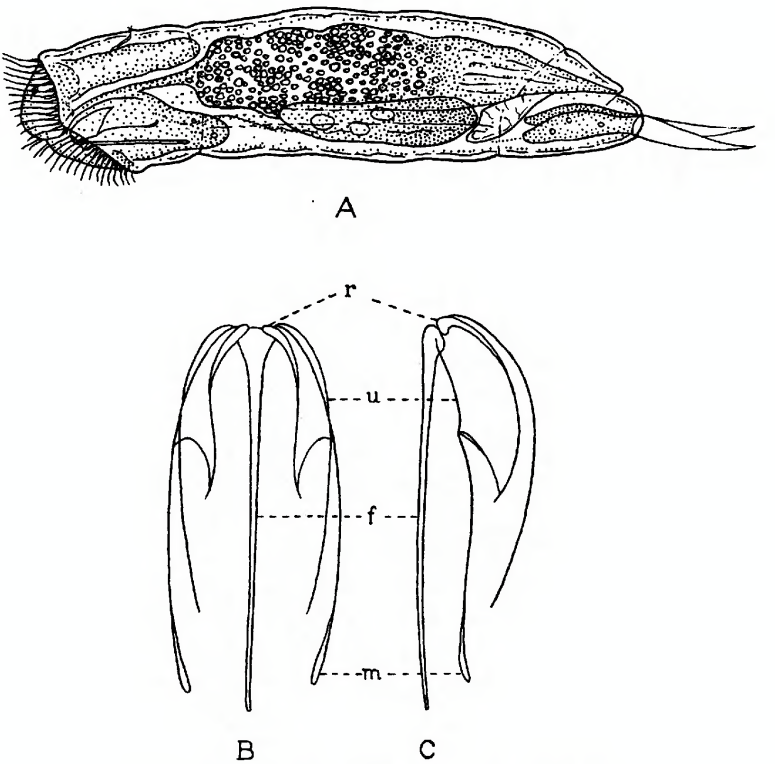

Fig. 6. *Cephalodella mira*, new species.

A, lateral view. B, trophi, ventral view. C, lateral view: *r*, ramus; *u*, uncus; *f*, fulcrum; *m*, manubrium.

entirely by suction, the horizontal action of the rami has been lost; they project backward and help form the domelike cavity that supports the wall of the mastax during pumping action. The unci are evanescent. There are a large pair of salivary glands attached to the lateral lobes of the mastax.

No gastric glands were observed. Digestion is probably intracellular, as the syncytial cells of the stomach walls are crowded with globular, greenish, chlorella-like inclusions.

The ganglion is very long. There are two small frontal eyespots.

Total length, 145μ; toes, 22μ; trophi, 30μ.

Cephalodella mira is well distributed on the Island. It has frequently been collected in Atlantic County, New Jersey and Vilas County, Wisconsin. The trophi bear a certain resemblance to those of *Cephalodella megalocephalia*(Glasscott) and *Cephalodella pheloma* Myers. This species is readily distinguished from the above two by the presence of frontal eyespots, the large salivary glands, and the minor differences in the trophi.

Cephalodella eurynota, new species

Figure 7

Cephalodella eurynota REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is cylindric, fusiform and gibbous dorsally. The head is rather small, slightly deflexed and obliquely truncate anteriorly. The lorica is rigid and the plates are well defined. The toes are very long, slender and decurved; they taper gradually from the base to very slender tips. The foot glands are large and stout.

The corona is oblique, strongly convex, and has prominent projecting lips.

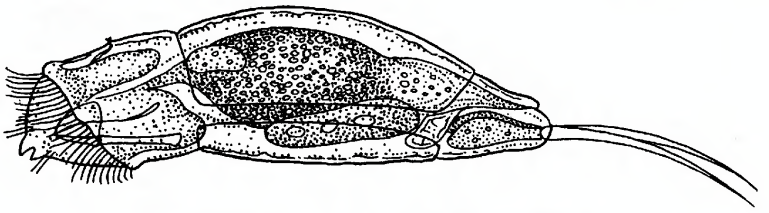

Fig. 7. *Cephalodella eurynota*, new species.
Lateral view.

The mastax is large. The fulcrum is straight and expanded posteriorly; the manubria are slightly recurved.

The ganglion is long, and there is no eyespot.

Total length, 105μ; toe, 30μ.

Cephalodella eurynota was collected during several summers in the Witch Hole, among submerged *Sphagnum*. It has also been found sparingly in Atlantic County, New Jersey. The curved fusiform body, the long, slender, decurved toes, the absence of an eyespot, together with the huge foot glands, serve to distinguish this from any other species of the genus.

Cephalodella ablusa, new species

Figure.8

Cephalodella ablusa REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is extremely elongate, cylindric, very slender and laterally compressed. The head is relatively short and the neck indistinctly marked. The abdomen is almost parallel-sided throughout its entire length. The lorica is soft and flexible, the plates being hardly apparent. The toes are robust and decurved laterally. Some

distance from the base they diminish abruptly and end in extremely slender, drawn-out tips. The foot glands are large and elongate.

The corona is oblique, strongly convex and without projecting lips.

The mastax has a pair of salivary glands attached to the lateral lobes. The fulcrum is fairly stout and enlarged posteriorly. The manubria are slender, recurved and slightly swollen near the tips. The gastric glands are enormous and pyriform in shape, the obtuse ends being directed forward.

The ganglion is normal, and there is no eyespot.

Total length, 148μ; toes, 25μ.

Cephalodella ablusa was collected among submerged *Fontinalis* in Round Pond during the summer of 1927. It is obscurely related to *Cephalodella elongata* Myers, from which it differs by the absence of eyespots, the larger gastric glands, the presence of salivary glands, and the toes.

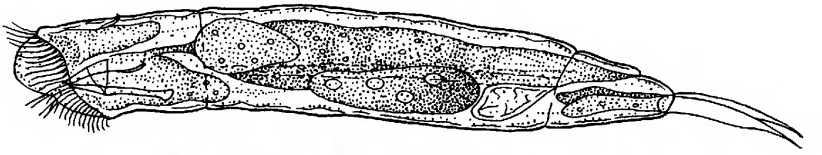

Fig. 8. *Cephalodella ablusa*, new species.
Lateral view.

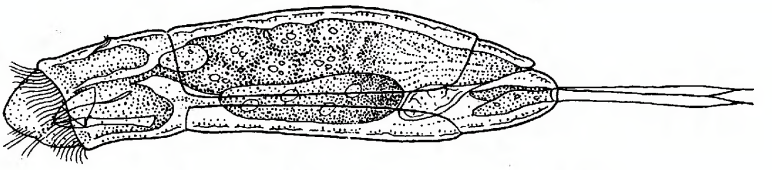

Fig. 9. *Cephalodella astricta*, new species.
Lateral view.

Cephalodella astricta, new species

Figure 9

Cephalodella astricta REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is elongate and slightly gibbous dorsally from the lateral view; it is much compressed dorsoventrally, being nearly twice as broad as it is in depth. The head is relatively small. The lorica is thin and flexible, but the plates are well defined. The foot is very short and stout. The toes are long, slender, and lanceolate from the lateral view; dorsally, they are parallel-sided and the tips are slightly outcurved.

The corona is strongly convex, and without projecting lips.

The mastax is relatively small. The fulcrum is stout and expanded posteriorly; the manubria are very slender, slightly recurved and expanded near the tips.

The ganglion is long, and there is no eyespot.

Total length, 155μ; toes, 35μ.

Cephalodella astricta was collected in Half Moon Pond during the summer of 1928. Its movements are extremely fast and active. The compressed body and the long lanceolate toes distinguish this from any other species of the genus.

Cephalodella lepida, new species

Figure 10

Cephalodella lepida REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is slender, cylindric and almost parallel-sided. The head is somewhat deflexed and oblique anteriorly. The head is set off by a well-marked neck constriction. The lorica is quite flexible, but the plates are sharply defined. The foot is small and the tail is minute. The toes are long, slender, blade-shaped and recurved; they taper gradually and end in acutely drawn out tips.

The corona is oblique, and the lips do not project as a beak.

The mastax carries a pair of salivary glands attached to the lateral lobes. The fulcrum is stout and reduced in the middle portion; the manubria are expanded in

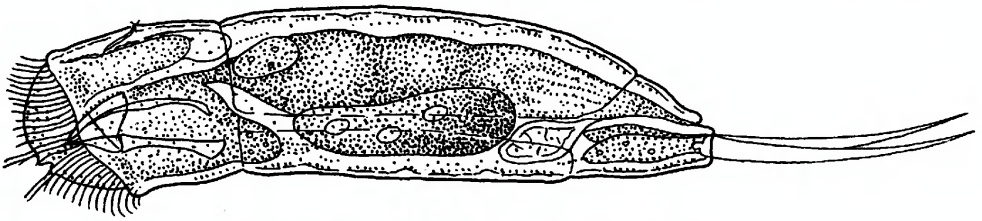

Fig. 10. *Cephalodella lepida*, new species.
Lateral view.

the middle and end in slightly swollen, decurved tips. The gastric glands are small and pigmented a yellowish red.

There is a clear, round retrocerebral sac curving over posterior portion of the ganglion, the duct of which can be traced some distance forward. There is no eyespot.

Total length, 225μ; toes, 52μ.

Cephalodella lepida is evenly distributed throughout the Island; it is especially abundant at times in the presence of decaying *Sphagnum* which has turned grayish. The species has been collected also in Atlantic County, New Jersey, under similar conditions. The presence of a retrocerebral sac, together with the remnants of the duct, and the differences in the trophi and toes, readily distinguish this species from *Cephalodella hyalina* Myers which it resembles superficially.

Cephalodella poitera, new species

Figure 11

Cephalodella poitera REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is short and stout. The head is large and obliquely truncate anteriorly. The neck is well marked, and the abdomen is evenly arched. The lorica is firm and the

plates are well defined. The foot is short and stout. The toes are blade-shaped, decurved, and taper from a broad base to very acute tips.

The corona is convex, and the lips project as a small beak.

The mastax is very large. The fulcrum is long and abruptly expanded posteriorly. The manubria are stout, expanded in the middle portion, and crutched at the tips. The gastric glands are small and reniform.

The ganglion is long; there is no eyespot.

Total length, 120μ; toes, 18μ.

Cephalodella poitera was collected in the Northeast Branch of the Barcelona, where it occurred at certain times in large numbers. Its movements are very rapid and restless. The species bears a superficial resemblance to *Cephalodella physalis* Myers and *Cephalodella globata* (Gosse), but differs from them by the absence of an eyespot, the elements of the trophi, and the shape of the toes.

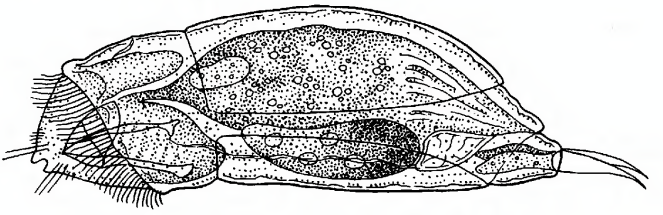

Fig. 11. *Cephalodella poitera*, new species.
Lateral view.

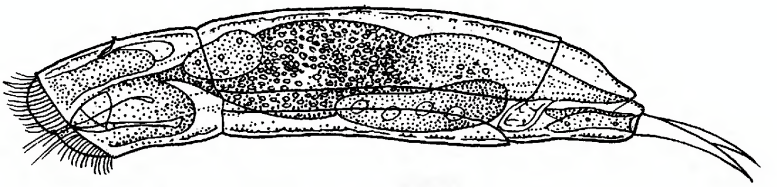

Fig. 12. *Cephalodella akrobeles*, new species.
Lateral view.

Cephalodella akrobeles, new species

Figure 12

Cephalodella akrobeles REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is elongate, slender, and slightly arched. The head segment is protected by a distinct lorica which contracts into definite dorsal folds when the corona is retracted. The neck is well marked, and the abdomen is laterally compressed, slightly arched dorsally and of the same depth throughout. The plates are sharply defined and the lateral clefts are wide apart. The foot is short and the tail is very small. The toes taper gradually to very fine, acute tips; they are wide apart at the base.

The mastax is relatively small. The fulcrum is straight and expanded posteriorly; the manubria are slender and abruptly decurved near the tips.

The ganglion is long and saccate; at its posterior end there is a clear retrocerebral sac, the duct of which can be traced a short distance forward. The gastric glands are very large and pyriform. There is no eyespot.

Total length, 120μ; toes, 20 μ.

Cephalodella akrobeles was collected among decaying *Utricularia* in the Barcelona. It is also well distributed in Atlantic County, New Jersey. This species, together with *Cephalodella praelonga* Myers, and *Cephalodella strepta* Myers, form a group within the genus all of which have very stiff inflexible loricae with the head-sheath falling into distinct folds on contraction. They are all slender and elongate, their manubria are bacillar and expanded posteriorly, their toes are long, and they have no eyespots, thus forming a closely related group within the genus.

Cephalodella praelonga, new species

Figure 13

Cephalodella praelonga REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is extremely elongate and slender. The head is relatively short and the integument is stiffened into a distinct lorica. When the corona is fully retracted, the

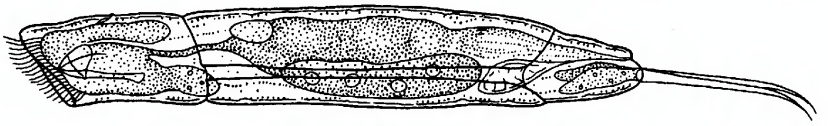

Fig. 13. *Cephalodella praelonga*, new species.
Lateral view.

cuticle falls into several dorsal head folds. The lorica is almost inflexible; the plates are sharply defined, and the lateral clefts are narrow and parallel-sided. The foot is very short. The toes are long, slender, and abruptly decurved distally; they end in fine decurved threadlike tips.

The corona has never been observed extended beyond the opening of the head-sheath. From numerous specimens examined, both living and preserved, it is doubtful if the head ever protrudes beyond the lorica.

The mastax is relatively small and has a pair of salivary glands attached to the lateral lobes. The fulcrum is straight and slightly expanded posteriorly; the manubria are very short, bacillar and slightly decurved.

The esophagus is very long and slender. The gastric glands are small and oval.

The ganglion is normal, and there is no eyespot.

Total length, 157μ; toes, 34μ.

Cephalodella praelonga was found in pools, among submerged *Sphagnum*, on Pond Heath, during the summer of 1930. It belongs to that group within the genus that is characterized by having the lorica of the head stiffened so as to form a sheath that falls into definite folds when the corona is retracted. The long slender toes, sharply decurved

near the tips, the presence of salivary glands, and the peculiar head opening readily distinguish this from the other members of the group.

Cephalodella abstrusa, new species

Figure 14

Cephalodella abstrusa REMANE, 1929–1933, p. 556 (*nomen nudum*).

The body is fairly stout, cylindric, evenly arched dorsally and nearly straight ventrally. The head is small and obliquely truncate anteriorly. The neck is marked off by a sharp constriction. While the integument is quite flexible, the plates are well defined. The toes are short, straight and conical, ending in blunt tips.

The corona is oblique and strongly convex, and the lips do not project.

The mastax is fairly large. The fulcrum is long and straight; the manubria are stout, slightly longer than the fulcrum, and expanded posteriorly.

The gastric glands are peculiar; they are large and oval, and the central portion is occupied by a refringent vacuole, which is present in every individual. The ovary is large, and the bladder is small.

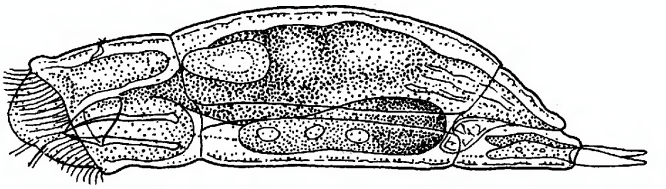

Fig. 14. *Cephalodella abstrusa,* new species.
Lateral view.

The ganglion is long, and there is no eyespot.

Total length, 104μ; toes, 12μ.

Cephalodella abstrusa was very abundant during several summers in plankton collections from Upper Hadlock Lake. The species is parasitic in the alga *Coelosphaerium küetzingianum* Naegeli.

It has been observed that some rotifers, after having been in captivity for a certain time, become subjected to a pathological condition of the gastric glands (Bryce, 1903, *op. cit.*, p. 528). One or more of the nuclei enlarge to such an extent that the whole gland appears like one clear vacuole. This is not the case with *Cephalodella abstrusa.* The animals were collected in their natural habitat, during several summers, and examined within the hour. The ecological conditions of Upper Hadlock Lake were normal and the oxygen content of the water was ample. This rotifer is a true parasite; nearly every cenobia of *Coelosphaerium* was infested, in many cases with six or more individuals, together with numerous eggs in the course of development.

The vacuolated gastric glands, the elements of the trophi, the short toes with blunt tips, and the parasitism of this species, readily distinguish it from any other of the genus.

New species of other genera of rotatoria will be described in Part V of the 'Distribution of Rotifera on Mount Desert Island,' and will appear in American Museum Novitates.

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